

SUNSPOTS AND EARTH TEMPERATURES.

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Table I gives the results of a comparison between the six-foot earth temperatures observed at Kenilworth (Kimberley) for the nineteen years 1900 to 1918, and the Wolfer's observed sunspot numbers as published in the 'Monthly Weather Review.' The comparison has been made by taking the mean earth temperature of any month and the sunspot number of the previous month: this in order to allow something for the lagging of the earth temperature wave with depth.* The means have then been grouped according to spot numbers below or above thirty. The work was begun more out of curiosity than with the expectation of getting any tangible result; and the direct comparison of curves was not very encouraging. The grouping, on the contrary, shows a somewhat higher temperature for a lower spot number, and that most definitely in the summer half of the year. If the one could be regarded as the direct result of the other this would indicate more intense radiation when the sun is free from spots than at other times. Direct observations of the solar radiation, however, are interpreted to mean less intensity when the sun is free from spots.†

The 1·7-metre earth temperatures observed at Córdoba for the fourteen years 1887 to 1900 have also been compared with the spot numbers in the same way. The results appear in Table II. They are of the same tendency, *i. e.* higher temperatures with fewer spots, though much more pronounced. So also the summer half is the more definite.

Table III refers to the five-foot earth temperatures observed at Adelaide during the thirty years 1878 to 1907. Proximity to the sea may have influenced the temperatures. Only in the summer months is any difference of temperature shown, though that is in the same direction as it is at the other stations.

In all three cases the results, so far as they go, are in agreement with previous ones.

* But no allowance has been made for the lagging in the annual values at the foot of the Table.

† "It seems likely that increased values of the solar constant attend increased sunspot numbers." McAdie, 'The Principles of Aërography,' 1917, p. 276.

TABLE I.—*Six-foot Earth Temperatures at Kimberley and corresponding Sunspot Numbers.*

Sunspot month.	Earth temperature month.	Sunspot numbers below 30.			Sunspot numbers above 30.		
		Mean of numbers.	Times.	Earth temperatures.	Mean of numbers.	Times.	Earth temperatures.
December .	January .	5·8	9	73·8°F.	55·2	10	72·3°F.
January .	February .	8·4	10	74·5	57·9	9	73·5
February .	March .	8·0	9	74·0	56·3	10	73·6
March .	April .	10·5	10	72·0	60·6	9	72·0
April .	May .	10·0	9	69·4	53·6	10	69·0
May .	June .	9·3	9	65·6	56·1	10	65·2
June .	July .	8·8	10	62·3	62·1	9	62·6
July .	August .	7·3	9	61·5	69·7	10	61·5
August .	September .	8·3	10	62·5	72·2	9	62·5
September .	October .	9·0	9	65·0	63·3	10	65·0
October .	November .	8·6	8	67·9	57·6	11	67·6
November .	December .	5·7	8	70·7	58·9	11	70·3
Summer half . . .		7·6	53	70·9	58·2	61	70·4
Winter half . . .		9·0	57	65·6	62·4	57	65·5
Year		9·0	—	68·2	59·1	—	67·9

TABLE II.—*1·7-metre Earth Temperatures at Córdoba and corresponding Sunspot Numbers.*

Sunspot month.	Earth temperature month.	Sunspot numbers below 30.			Sunspot numbers above 30.		
		Mean of numbers.	Times.	Earth temperatures.	Mean of numbers.	Times.	Earth temperatures.
December .	January .	11·0	7	20·08°C.	58·0	7	18·93°C.
January .	February .	12·6	8	20·67	60·2	6	19·55
February .	March .	13·0	8	20·72	65·7	6	19·66
March .	April .	11·3	8	19·94	53·2	6	18·89
April .	May .	10·4	8	18·56	65·2	6	18·00
May .	June .	14·5	9	16·97	74·8	5	16·16
June .	July .	12·1	8	15·55	72·0	6	14·95
July .	August .	13·3	8	14·97	70·5	6	14·47
August .	September .	13·7	8	15·34	72·4	6	14·12
September .	October .	9·4	6	16·07	57·8	8	15·10
October .	November .	11·3	8	17·23	63·3	6	15·71
November .	December .	6·9	7	18·83	50·7	7	17·44
Summer half . . .		10·7	44	18·93	59·3	40	17·73
Winter half . . .		12·5	48	16·89	68·0	35	16·10
Year		13·5	—	17·82	62·9	—	16·91

TABLE III.—*Five-foot Earth Temperatures at Adelaide and corresponding Sunspot Numbers.*

Sunspot month.	Earth temperature month.	Sunspot numbers below 30.			Sunspot numbers above 30.		
		Mean of numbers.	Times.	Earth temperatures.	Mean of numbers.	Times.	Earth temperatures.
December .	January .	9.3	15	66.9°F.	55.9	15	66.3°F.
January .	February .	11.5	15	68.2	56.4	15	67.6
February .	March .	13.0	16	67.8	67.7	14	67.8
March .	April .	10.6	14	66.4	55.9	16	66.3
April .	May .	9.0	14	63.9	61.6	16	63.9
May .	June .	12.7	15	61.3	58.1	15	61.3
June .	July .	11.3	14	59.1	61.1	16	59.1
July .	August .	13.0	15	57.9	68.2	15	58.0
August .	September	12.1	14	58.2	59.5	16	58.1
September	October .	10.7	13	59.4	58.2	17	59.3
October .	November	10.7	14	61.8	59.6	16	61.5
November	December	6.6	12	64.2	53.9	18	64.1
Summer half . . .		10.3	85	64.7	58.6	95	64.4
Winter half . . .		11.4	86	61.1	60.7	94	61.1
Year		12.5	—	63.0	57.8	—	62.7